

REMARKS

Applicants appreciate the Examiner's thorough consideration provided the present application. Claims 1-12 are now present in the application. Claims 1, 2, 4, 7 and 10 have been amended. Claims 1, 4, 7 and 10 are independent. Reconsideration of this application, as amended, is respectfully requested.

Claim Rejections Under 35 U.S.C. § 103

Claims 1, 3 and 7-9 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishii, U.S. Patent No. 6,529,448, in view of Evans, U.S. Patent No. 5,051,950. Claim 2 stands rejected under 35 U.S.C. § 103(a) as being unpatentable over Ishii in view of Evans, and further in view of Mitsuoka, WO 99/59147. Claims 4-6 and 10-12 stand rejected under 35 U.S.C. § 103(a) as being unpatentable over Watanabe, U.S. Patent No. 5, 784,343, in view of Ishii and Evans. These rejections are respectfully traversed.

Independent claims 1 and 4 recite "a pair of conductive wires extended from the signal-writing unit...the ends of the pair of conductive wires being separated by a gap, the voltage applied by the signal-writing unit on the pair of conductive wires generating an electric field around the gap so as to polarize the data-storing surface on the disk to write the data". Independent claim 1 further recites "the ends of the pair of conductive wires being approached to the data-storing surface to induce polarization of the data-storing surface and the electric signals read from the disk being transmitted to the signal-processing unit."

Independent claims 7 and 10 recite “exerting a voltage on a pair of conductive wires on the pick-up head while writing, thereby generating an electric field between the pair of conductive wires”, “approaching the electric field to the disk so as to polarize a data-storing surface made by the ferroelectric material to write down the data”. Independent claim 7 further recites “utilizing the ends of the pair of conductive wires to induce the polarized electric charges on the data-storing surface”.

Applicants respectfully submit that the above combinations of elements and steps as set forth in independent claims 1, 4, 7 and 10 are not disclosed nor suggested by the references relied on by the Examiner.

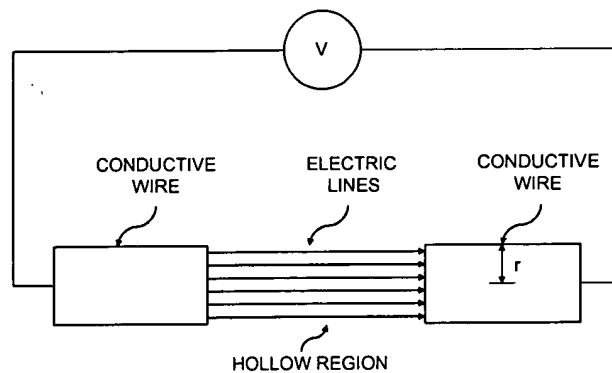
First, the Examiner in his Advisory Action responded to Applicants’ arguments that Ishii nowhere teaches an electric-reading or electric-writing system as recited in claims 1, 4, 7 and 10 by citing a new reference, *Elements of Physics*, pages 786-795, and alleging “[i]f applicants’ invention is drawn to purely an electrical process, why does the magnetic field by their device not influence the ferromagnetic material?” (see Advisory Action, page 2, lines 8-10; emphasis added.) Applicants respectfully disagree with and respond to the Examiner’s allegation as follows.

The present invention is directed to a structure of pick-up head and its method for accessing signals, which operate in coordination with the characteristics of ferroelectric material, and utilize the inducing of electric field to develop a structure of pick-up head capable of optical-reading / electric-writing or electric-reading / electric-writing and its method for accessing signals.

The pickup head in the present application is designed to access data on a disk formed from Ferroelectric material, not from Ferromagnetic material. The pick-up head has a signal-writing unit, which is able to generate a regular voltage while the pick-up head performs the function of writing. In the illustrated embodiment, the voltage enables the ends of the first wire 121 and the second wire 122 to generate an appropriate electric field so as to polarize the data-storing surface made by the ferroelectric material on the disk.

Permanent polarized electric charges are generated by imposing an external electrical field on the Ferroelectric material. Recordation of data is done by adjusting the arrangement of the permanent polarized electric charges through imposing an external voltage.

The polarized electric charges are generated by imposing voltage on a pair of conductive wires. The conductive wires may be exemplarily illustrated in the accompanying drawing



According to the Maxwell-Ampere equation, $\oint \mathbf{B} \cdot d\mathbf{l} = \frac{-d[\int \mathbf{E} \cdot d\mathbf{s}]}{c^2 dt}$.

Considering the conductive wires in the drawing, the magnetic field in the hollow region

is obtained from the equation: $B = \frac{1}{2\pi r c^2} \times \frac{d[\int E \cdot ds]}{dt}$. Suppose the magnitude of the electric field is $10^6 \sim 10^7$ (v/cm), which is sufficient to generate the polarized electric charges, and the electric lines are vertical to the hollow region, then $\int E \cdot ds = E \cdot \pi r^2$.

In the recoding process, for the region with the size of $1 \mu\text{m}$ in the recording unit, the rotation speed of the disk is 60m/sec (high speed), then $t = \frac{1}{60 \times 10^6}$.

Therefore, $B = \frac{1}{2\pi r c^2} \times \frac{10^6 \sim 10^7}{\frac{1}{60 \times 10^6}} \times \pi r^2$, wherein r represents the radius of the conductive

wires.

$$B = \frac{r}{2\pi c^2} \times 60 \times 10^{12} \sim 10^{13} = \frac{r}{2\pi \times 9 \times 10^{16}} \times 60 \times 10^{12} \sim 10^{13} = 10^{-4} \sim 10^{13} \times \frac{r}{\pi \times 3}.$$

If the radius is supposed to be $1 \mu\text{m}$, then the magnitude of the magnetic field is about $10^{-8} \sim 10^{-9}$ Tesla $\doteq 10^{-4} \sim 10^{-5}$ Gauss. Therefore, the magnetic field in the hollow region is very small and insignificant.

As mentioned in the last Reply after Final filed August 2, 2005, Ishii merely discloses a magnetic-optical-writing and optical-reading device. In view of the above explanation, it is clear that claims 1 and 7 are directed to an electric-writing and electric-reading apparatus and method

and claims 4 and 10 are directed to an electric-writing and optical-reading apparatus and method. Those features are clearly absent from Ishii.

Second, the Examiner in his Advisory Action also alleged that Ishii in FIG. 8 and its related description discloses that two coils are separated from each other (see Advisory Action, page 2, lines 11-13). Again, Applicants respectfully disagree with and respond to the Examiner's allegation as follows.

The Examiner seemed to consider Ishii's coil patterns 31a and 31b to be the pair of conductive wires of claims 1, 4, 7 and 10. However, the Examiner seems to ignore that the coil patterns 31a and 31b are connected through a connecting portion 34a (see col. 8, lines 49-50; FIG. 8J) as a single coil 21. In other words, the coil patterns 31a and 31b have an equal potential. Therefore, applying the voltage on the coil patterns 31a and 31b cannot generate an electric field around the gap between the coil patterns 31a and 31b. Accordingly, Ishii still fails to teach "a pair of conductive wires extended from the signal-writing unit...the ends of the pair of conductive wires being separated by a gap, the voltage applied by the signal-writing unit on the pair of conductive wires generating an electric field around the gap so as to polarize the data-storing surface on the disk to write the data" as recited in independent claims 1 and 4 and "exerting a voltage on a pair of conductive wires on the pick-up head while writing, thereby generating an electric field between the pair of conductive wires" as recited in independent claims 7 and 10.

With regard to the Examiner's reliance on Evans, Mitsuoka and Watanabe, these references also fail to disclose the above combinations of elements and steps as set forth in

amended independent claims 1, 4, 7 and 10. Accordingly, these references fail to cure the deficiencies of Ishii.

Accordingly, none of the references utilized by the Examiner individually or in combination teach or suggest the limitations of independent claims 1, 4, 7 and 10 or their dependent claims. Therefore, Applicants respectfully submit that all of the claims clearly define over the teachings of the references relied on by the Examiner.

Accordingly, reconsideration and withdrawal of the rejections under 35 U.S.C. § 103 are respectfully requested.

CONCLUSION

It is believed that a full and complete response has been made to the Office Action, and that as such, the Examiner is respectfully requested to send the application to Issue.

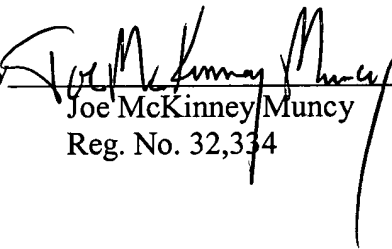
In the event there are any matters remaining in this application, the Examiner is invited to contact Joe McKinney Muncy, Registration No. 32,334 at (703) 205-8000 in the Washington, D.C. area.

Pursuant to 37 C.F.R. §§ 1.17 and 1.136(a), Applicants respectfully petition for a three (3) month extension of time for filing a response in connection with the present application and the required fee of \$1,020.00 is attached herewith.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

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